

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**Low-voltage switchgear and controlgear assemblies –  
Part 6: Busbar trunking systems (busways)**

**Ensembles d'appareillage à basse tension –  
Partie 6: Systèmes de canalisation préfabriquée**



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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –****Part 6: Busbar trunking systems (busways)**

## FOREWORD

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International Standard IEC 61439-6 has been prepared by subcommittee 17D: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

This first edition of IEC 61439-6 cancels and replaces the third edition of IEC 60439-2 (2000) and its Amendment 1 (2005), and constitutes a technical revision.

This edition of IEC 61439-6 includes the following significant technical changes with respect to the latest edition of IEC 60439-2:

- alignment on the second edition of IEC 61439-1 (2011) regarding the structure and technical content, as applicable;
- introduction of new verifications, accordingly;
- correction of inconsistencies in resistance, reactance and impedance measurements and calculations;
- numerous editorial improvements.

The text of this standard is based on the following documents:

FDIS	Report on voting
17D/452/FDIS	17D/454/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard is to be read in conjunction with the second edition of IEC 61439-1. The provisions of the general rules dealt with in IEC 61439-1 (hereinafter referred to as Part 1) are only applicable to this standard insofar as they are specifically cited. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

Subclauses that are numbered with a 101 (102, 103 etc.) suffix are additional to the same subclause in Part 1.

Tables and figures in this Part 6 that are new are numbered starting with 101.

New annexes in this Part 6 are lettered AA, BB, etc.

The “in some countries” notes regarding differing national practices are contained in the following subclauses:

#### 5.4

A list of all parts of the IEC 61439 series, under the general title *Low-voltage switchgear and controlgear assemblies* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under “<http://webstore.iec.ch>” in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

### Part 6: Busbar trunking systems (busways)

#### 1 Scope

NOTE 1 Throughout this part, the abbreviation BTS is used for a busbar trunking system. Where reference to Part 1 is made, the term ASSEMBLY therefore reads as "BTS".

This part of IEC 61439 lays down the definitions and states the service conditions, construction requirements, technical characteristics and verification requirements for low voltage BTS (see 3.101) as follows:

- BTS for which the rated voltage does not exceed 1 000 V in case of a.c. or 1 500 V in case of d.c.;
- BTS intended for use in connection with the generation, transmission, distribution and conversion of electric energy, and for the control of electric energy consuming equipment;
- BTS designed for use under special service conditions, for example in ships, in rail vehicles, and for domestic applications (operated by unskilled persons), provided that the relevant specific requirements are complied with;

NOTE 2 Supplementary requirements for BTS in ships are covered by IEC 60092-302.

- BTS designed for electrical equipment of machines. Supplementary requirements for BTS forming part of a machine are covered by the IEC 60204 series.

This standard applies to all BTS whether they are designed, manufactured and verified on a one-off basis or fully standardized and manufactured in quantity.

The manufacture and/or assembly may be carried out by a manufacturer other than the original manufacturer (see 3.10.1 and 3.10.2 of Part 1).

This standard does not apply to individual devices and self-contained components, such as motor starters, fuse switches, electronic equipment, etc. which will comply with the relevant product standard.

This standard does not apply to the specific types of ASSEMBLIES covered by other parts of the IEC 61439 series, to supply track systems in accordance with IEC 60570, to cable trunking and ducting systems in accordance with the IEC 61084 series, nor to power track systems in accordance with the IEC 61534 series.

#### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60332-3-10:2000, *Tests on electric and optical fibre cables under fire conditions – Part 3-10: Test for vertical flame spread of vertically-mounted bunched wires or cables – Apparatus*

IEC 60439-2:2000, *Low-voltage switchgear and controlgear assemblies – Part 2: Particular requirements for busbar trunking systems (busways)*

IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 61786:1998, *Measurement of low-frequency magnetic and electric fields with regard to exposure of human beings – Special requirements for instruments and guidance for measurements*

ISO 834-1:1999, *Fire-resistance tests – Elements of building construction – Part 1: General requirements*

### 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

*Additional definitions:*

#### 3.101

##### **busbar trunking system**

##### **BTS**

##### **busway**

enclosed ASSEMBLY used to distribute and control electrical energy for all types of loads, intended for industrial, commercial and similar applications, in the form of a conductor system comprising busbars which are spaced and supported by insulating material in a duct, trough or similar enclosure

[SOURCE: IEC 60050-441:1984, 441-12-07 modified]

Note 1 to entry: See 3.1.1 of Part 1 for the definition of ASSEMBLY.

Note 2 to entry: The BTS may consist of a full range of mechanical and electrical components such as:

- busbar trunking units with or without tap-off facilities;
- phase transposition, expansion, flexible, feeder and adapter units;
- tap-off units;
- additional conductors for communication and/or control.

Note 3 to entry: The term "busbar" does not presuppose the geometrical shape, size and dimensions of the conductor.

#### 3.102

##### **busbar trunking unit**

##### **BTU**

unit of a BTS complete with busbars, their supports and insulation, external enclosure and any fixing and connecting means to other units, with or without tap-off facilities

Note 1 to entry: BTUs may have different geometrical shapes such as straight length, elbow, tee or cross.

#### 3.103

##### **busbar trunking run**

##### **BT run**

number of BTUs connected together to form the BTS, excluding the tap-off units

#### 3.104

##### **busbar trunking unit with tap-off facilities**

##### **BTU with tap-off facilities**

BTU designed to enable tap-off units to be installed at one or more points as predetermined by the original manufacturer



**3.105****busbar trunking unit with trolley-type tap-off facilities****BTU with trolley-type tap-off facilities**

BTU designed to permit the use of roller- or brush-type tap-off units

**3.106****busbar trunking adapter unit****adapter BTU**

BTU intended to connect two units of the same system but of different type or of different rated current

**3.107****busbar trunking thermal expansion unit****thermal expansion BTU**

BTU intended to permit a certain movement in the axial direction of the BT run due to thermal expansion of the system

Note 1 to entry: This term does not presuppose which elements permit movement, e.g. the conductors within the enclosure or both conductors and enclosure

**3.108****busbar trunking phase transposition unit****phase transposition BTU**

BTU intended to change the relative positions of the phase conductors in order to balance the inductive reactances or to transpose the phases (such as L1-L2-L3-N to N-L3-L2-L1)

**3.109****flexible busbar trunking unit****flexible BTU**

BTU having conductors and enclosures designed to allow a specified change of direction during installation

**3.110****busbar trunking feeder unit****feeder BTU**

BTU serving as an incoming unit

Note 1 to entry: See 3.1.9 of Part 1 for the definition of incoming unit.

**3.111****tap-off unit**

outgoing unit, either fixed or removable, for tapping-off power from the BTU

Note 1 to entry: See 3.1.10, 3.2.1 and 3.2.2 of Part 1 for the definition of outgoing unit, fixed part and removable part.

Note 2 to entry: A plug-in tap-off unit is a removable tap-off unit (see 8.5.2) which can be connected or disconnected by manual operation

**3.112****busbar trunking unit for building movements****BTU for building movements**

BTU intended to allow for building movements due to thermal expansion, contraction and/or flexing of the building

**3.113****busbar trunking fire barrier unit****fire barrier BTU**

BTU or a part of, intended to prevent the propagation of fire through building divisions for a specified time under fire conditions

## 4 Symbols and abbreviations

This clause of Part 1 is applicable except as follows.

*Addition:*

Symbol / Abbreviation	Term	Subclause
$k_{1A}$	temperature factor of the BTS	5.3.1
$k_{1c}$	temperature factor of a circuit	5.3.2
$k_{2c}$	mounting factor of a circuit	5.3.2
$R, X, Z$	phase conductor and fault-loop characteristics	5.101

## 5 Interface characteristics

This clause of Part 1 is applicable except as follows.

### 5.1 General

*Replacement:*

The characteristics of the BTS shall ensure compatibility with the ratings of the circuits to which it is connected and the installation conditions and shall be declared by the BTS manufacturer using the criteria identified in 5.2 to 5.6 and 5.101 to 5.102.

The specification schedule according to informative Annex C is intended to help the user and the BTS manufacturer to meet this objective, whether the user:

- select catalogue products the characteristics of which meet their needs, and the requirements of this standard,
- and/or make a specific agreement with the manufacturer.

NOTE Annex C also relates to the topics dealt with in Clauses 6 and 7.

In some cases information provided by the BTS manufacturer may take the place of an agreement.

#### 5.2.4 Rated impulse withstand voltage ( $U_{imp}$ ) (of the ASSEMBLY)

*Replacement of the NOTE:*

NOTE Unless otherwise specified, the rated impulse withstand voltage is selected according to overvoltage category IV (origin of installation level) or III (distribution circuit level) as given in Table G.1 of Part 1.

#### 5.3.1 Rated current of the ASSEMBLY ( $I_{nA}$ )

*Addition:*

NOTE 4 Where the BTS is not equipped with a single incoming unit at one end of the BT run, (e.g. incoming unit not installed at one end of the BTS, or more than one incoming unit), the rated currents will be subject to agreement between the user and the manufacturer.

The rated current shall apply for a specified mounting orientation (see 5.3.2). However the influence of the mounting orientation may be ignored for short (e.g. less than 3 m long) vertical sections in a horizontal BTS.